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NATIONAL DAM INSPECTION PROGRAM. PARK PLACE DAM NUMBER 3 (NDS I--ETC(U)
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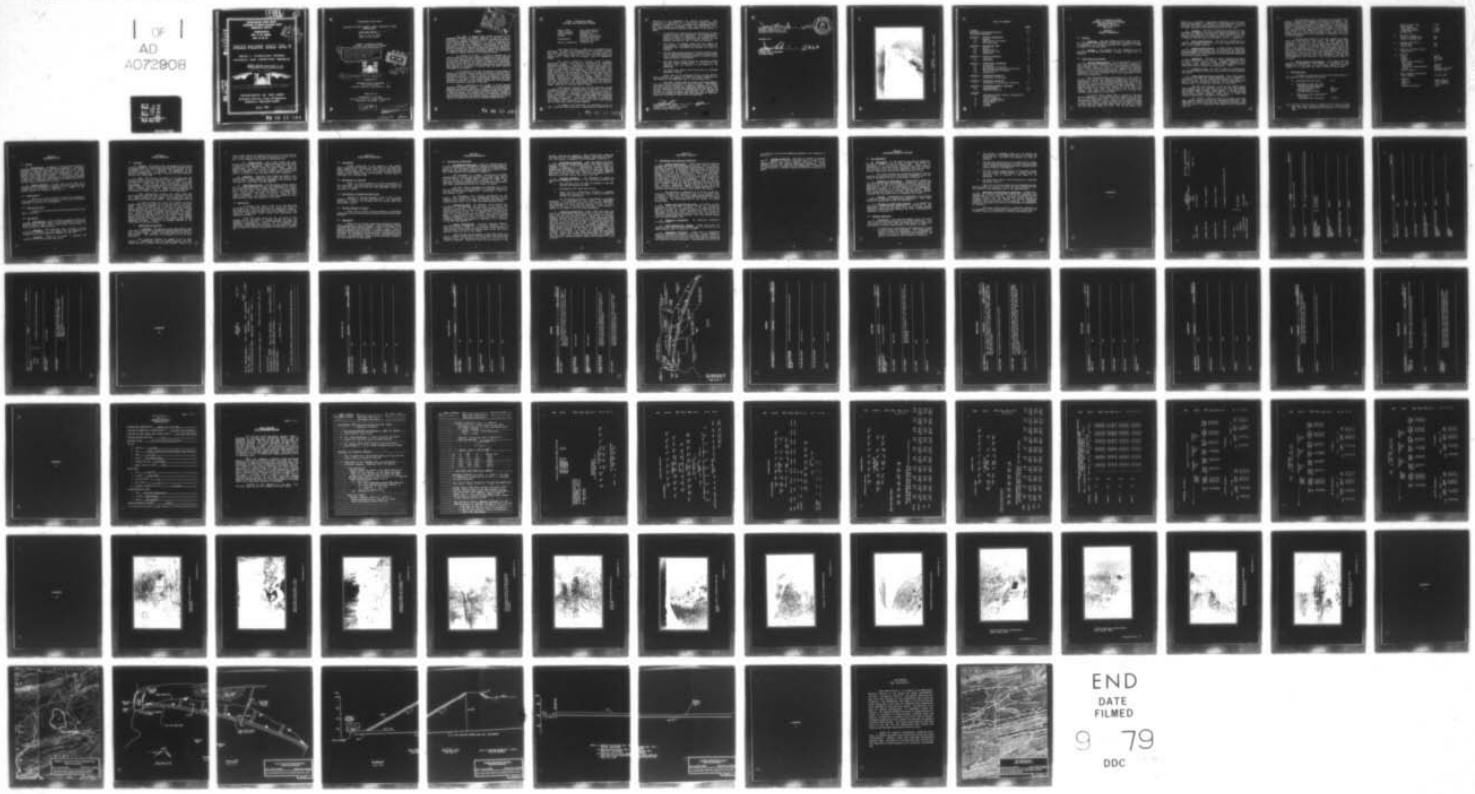

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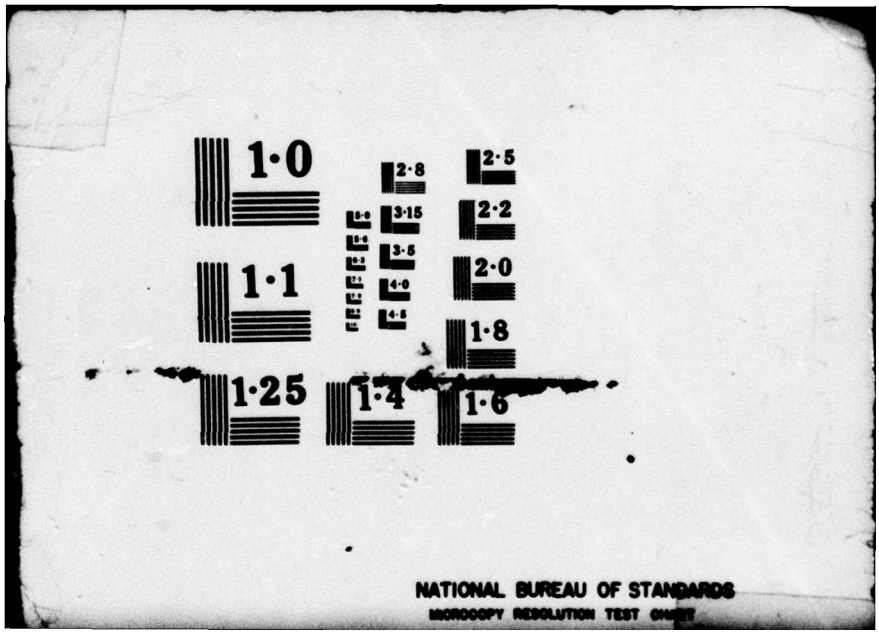
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NATIONAL BUREAU OF STANDARDS

SUSQUEHANNA RIVER BASIN
TRIBUTARY OF NORTH MAHANOY CREEK
SCHUYLKILL COUNTY

PENNSYLVANIA
NDS ID PA. 00682
DER ID 54-12

PARK PLACE DAM NO. 3

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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CONTRACT # DACW31-79-C-0017

DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

MAY 1979

SUSQUEHANNA RIVER BASIN

TRIBUTARY OF NORTH MAHANOY CREEK, SCHUYLKILL COUNTY
PENNSYLVANIA

PARK PLACE DAM NO. 3

NDS I.D. NO. PA 00682
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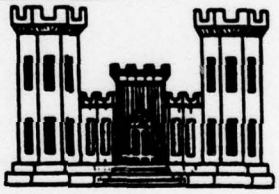
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



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(15) DACW31-79-C-0017

Prepared by:

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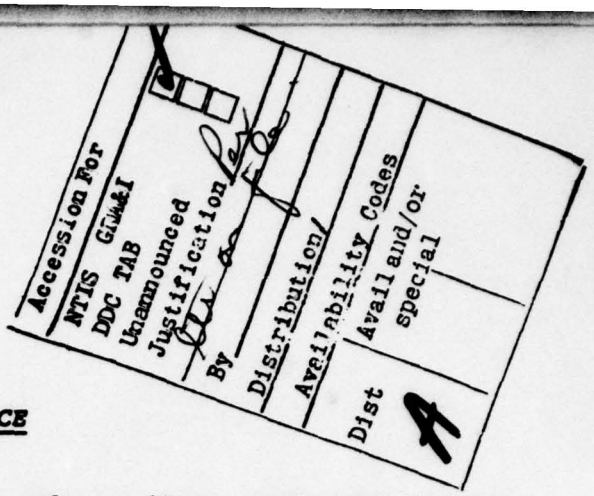
Submitted to:

DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

(11) MAY 79



PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams for Phase I Investigations. Copies of these guidelines may be obtained from the Office of the Chief of Engineers, Washington, D. C., 20314. The purpose of a Phase I investigation is to expeditiously identify those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify the need for more detailed studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected, and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

Name of Dam:	Park Place Dam No. 3
County Located:	Schuylkill County
State Located:	Pennsylvania
Stream:	Unnamed tributary of North Mahanoy Creek
Coordinates:	Latitude 40° 50.4' Longitude 76° 6.7'
Date of Inspection:	10 April 1979

Park Place Dam No. 3, owned by the Hazelton City Authority, is used as a supplemental water reservoir supply for Delano and Park Place, Pennsylvania. The dam, built in 1909, is reportedly constructed of clay and hand-placed and dumped rock. There was no evidence found of embankment drains.

The visual inspection revealed steep irregular downstream slopes, which may be attributed to long-term embankment movement. Longitudinal cracking noted along the crest is most probably attributed to freeze-thaw cycles but, without a detailed investigation, cracking associated with slope movement cannot be discounted. Wet areas were noted along the toe of the embankment, predominantly along the left side of the valve house structure. Most of this was traced to leakage through the emergency spillway. However, without further investigation, embankment seepage cannot be discounted. The spillway and discharge channel are considered to be in poor condition. The outlet works appear to be neglected and the valves may not be serviceable, as they are deteriorated, rusty and in obvious need of repair.

Calculations indicate the existing spillway system is capable of passing approximately 19 percent of the PMF without overtopping. For flows on the order of 50 percent or more, overtopping is assessed to cause embankment failure, which would result in increased property damage downstream and possible loss of life. Thus, the spillway is considered "Seriously Inadequate". This "High" hazard dam is classified as a "Small" size structure by virtue of its 32 foot height and 126 acre-foot total storage capacity.

In summary, the structure is considered to be in poor condition and additional investigations pertaining to

stability of the embankment are clearly warranted. The structure is considered in a noncritical unsafe condition pending the results of the investigations recommended below. All work should be performed under the supervision of a registered professional engineer experienced in the design of dams.

1. A geotechnical investigation and evaluation of this structure should be performed. This investigation should include the installation of piezometers or observation wells to determine the location of the phreatic surface for use in stability analysis.

2. The source of seepage along the toe should be investigated. The seepage should be collected and monitored for turbidity and changes in rates of seepage.

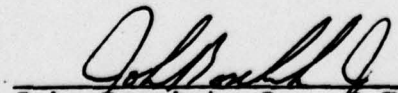
3. The spillway system should be reconstructed to meet current hydrologic/hydraulic criteria as determined from a detailed hydrologic/hydraulic analysis using state-of-the-art information.

4. The pond drain system should be thoroughly tested and the valves rehabilitated to insure that the reservoir can be drained in the event of an emergency.

5. The pond drain should have provisions for upstream emergency closure.

Other work to be performed during routine maintenance includes the removal of trees and other vegetation on the slopes of the embankment and in the spillway area.

The Owner should develop formal maintenance/operation and warning procedures for this facility. Maintenance procedures should include an inspection checklist to insure that all items are periodically inspected and maintained. The warning procedures should include monitoring the dam during periods of unusually heavy precipitation and a method of warning downstream residents when high flows can be expected. Evacuation procedures should also be developed.



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6/15/79
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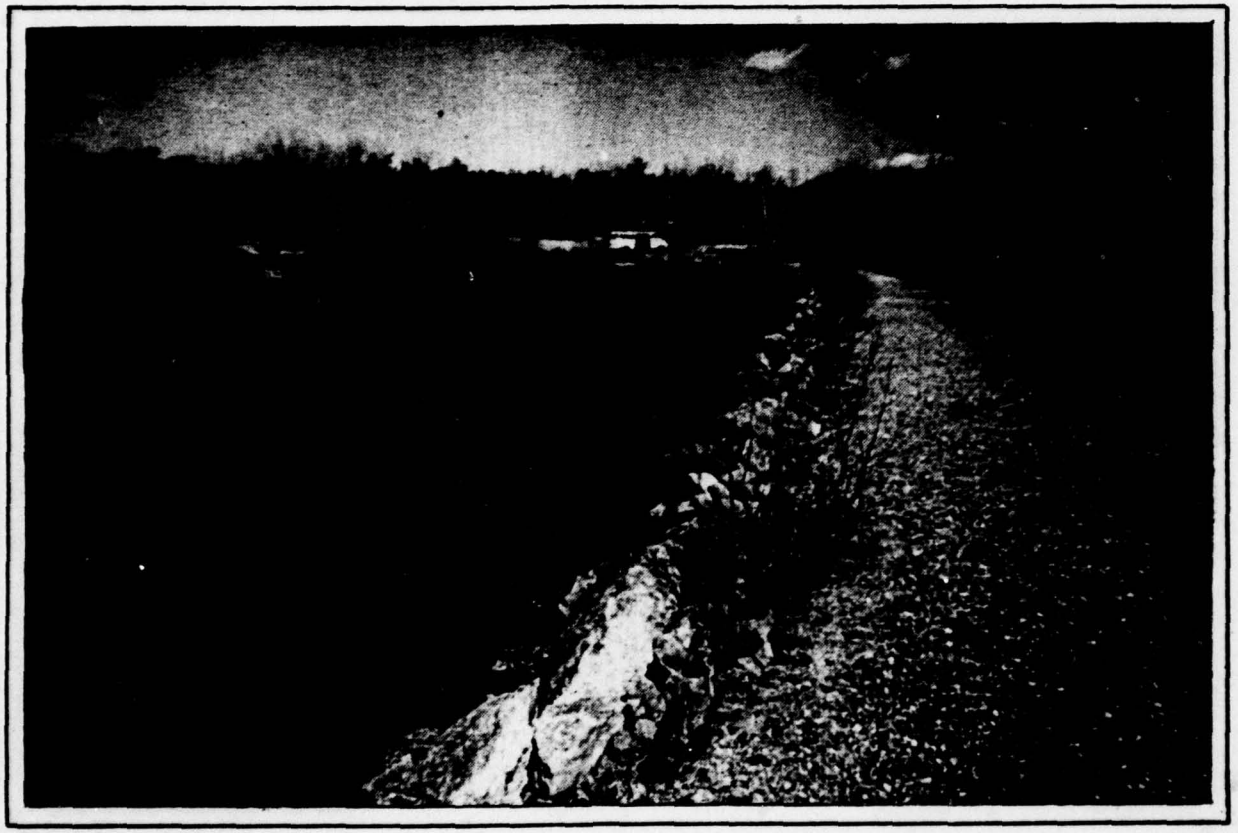
REGISTERED PROFESSIONAL ENGINEER

APPROVED BY:

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

17 July 79
Date



OVERVIEW
PARK PLACE DAM NO. 3, SCHUYLKILL COUNTY, PENNSYLVANIA

TABLE OF CONTENTS

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
PARK PLACE DAM NO. 3
NATIONAL ID #PA 00682
DER #54-12

SECTION 1
PROJECT INFORMATION

1.1 General.

a. Authority. The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.

b. Purpose. The purpose of the inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project.

a. Dam and Appurtenances. Park Place Dam No. 3 is a 32 foot high earthen embankment across an unnamed tributary of North Mahanoy Creek. The 685 foot long embankment impounds a 109 acre-foot reservoir within an 0.27 square mile drainage basin. Since very limited data exists regarding the physical features of the dam and appurtenances, most of the features described herein were obtained from field measurements taken during this inspection.

The downstream slope was measured to be 2H:1V and is covered with riprap and occasional vegetation, as shown on Photographs 7 and 8. The average upstream slope could not be measured as the very small freeboard between the crest of the dam and the normal pool prevented a reliable measurement. The upstream portion of the slope between the crest and to at least several feet below the waterline was covered with riprap. The crest width ranges from 10 to 12 feet and averages approximately 11 feet wide.

A 10-inch water supply pipe is located at the base of the embankment. An eight-inch water supply line branches off in the downstream valve house at the downstream toe. Discharge through both lines is controlled by valves located in the valve house. Plans reviewed at the Owner's office indicate that the downstream invert near the valves is 1,756± and the upstream invert is 1,759. The 10-inch pipe, which

serves as a blow-off, reportedly discharges some distance below the embankment. Located at the left abutment is a stone spillway 28.5 feet wide, as shown in Photograph 4. There is no other information available pertaining to this dam.

b. Location. The dam is located approximately 2¼ miles northeast of Mahanoy City near Park Place, Pennsylvania. The dam site and reservoir are shown on USGS Quadrangle entitled "Delano, Pennsylvania" at coordinates N 40° 50.4' W 76° 6.7'. A regional location plan is enclosed as Plate 1, Appendix E.

c. Size Classification. The dam is classified as a "Small" size dam by virtue of its 32 foot height and 126 acre-foot total storage capacity.

d. Hazard Classification. A "High" hazard classification is assigned consistent with the potential for extensive property damage and probable loss of life along the creek near the confluence with North Mahanoy Creek and farther downstream along North Mahanoy Creek.

e. Ownership. The dam is owned, operated and maintained by Hazelton City Authority. All correspondence should be sent to Mr. Robert Zientek, Manager, Hazelton City Authority, Water Department, 230-240 South Wyoming Street, Post Office Box B, Hazelton, Pennsylvania 18201.

f. Purpose of Dam. The dam is used as a supplemental water supply source for Delano, Park Place and other surrounding areas.

g. Design and Construction History. Park Place Dam No. 3 was built in 1909 for water supply by Lentz & Company in accordance with drawings prepared by company engineers. Mr. John H. Strauch, consulting engineer for the Philadelphia & Reading Coal & Iron Company, assisted in the design.

The dam was purchased in 1911 by the Lehigh Valley Coal Company and the reservoir was tied into the Wyoming Valley Water Supply Company. Based solely on information from the "Report Upon the Park Place Dam No. 3 of the Wyoming Valley Water Supply Company", dated April 8, 1915, the following additional information is supplied.

Mr. Strauch indicated that all surface materials were removed before placing the embankment material. The embankment is reported to rest upon "clay which overlies shale rock to which it is understood that puddle cutoff trench was carried".

The embankments were constructed from selected clay placed in layers and compacted by teams and scrapers. Mr. Strauch indicated that rollers were not used, but he was quite satisfied that the material was deposited in a satisfactory manner. The upstream face of the dam was made of hand-placed rock, the downstream was protected with riprap and the crest was reported to be topped off with gravel. A clay puddle cutoff wall six feet thick extends a few feet into the foundation material and was constructed throughout the length of the embankment.

The spillway located at the left abutment was about three feet deep and 28.5 feet wide. The water supply pipe consists of a 10-inch pipe located at the base of the embankment, supported on a continuous stone masonry wall and enclosed in a block of concrete resting upon the top of the wall. The upstream end of the pipe was sealed and water admitted through perforations in the last length of pipe. At the valve house, an eight-inch pipe branched off as a water supply pipe. The 10-inch pipe also served as a blow-off and discharges some distance below the embankment. During this 1979 inspection, the location of the 10-inch outlet could not be found.

h. Normal Operating Procedures. The ungated spillway requires no operation. The valves in the house at the downstream toe are used to control water supply flow downstream. It is reported that these valves are rarely used.

1.3 Pertinent Data.

A summary of pertinent data for Park Place Dam No. 3 and reservoir are presented as follows.

a.	Drainage Area (sq miles)	0.27
b.	Discharge at Dam Site (cfs)	
	Maximum Spillway Capacity (existing conditions)	167
	Maximum Flood	Unknown
	Minimum Required Flow	None
c.	Elevations (feet above MSL)[1]	
	Top of Dam (minimum crest elevation)	1,790.7

(1) Spillway crest elevation assumed to be 1,789 from USGS map. All other elevations are relative to this elevation.

	Spillway Weir Crest	1,789
	Water Supply	
	Upstream Invert	1,759±
	Downstream Invert	1,756±
	Normal Pool	1,789
d.	Reservoir (feet)	
	Length at Normal Pool	500
	Fetch at Normal Pool	500
e.	Storage (acre-feet)	
	Normal Pool	109
	Top of Dam	126
f.	Reservoir Surface (acres)	
	Normal Pool	7
g.	Dam Data	
	Type	Earth
	Length	685 feet
	Height	32± feet
	Crest Width (average)	11
	Side Slopes	
	Upstream	Unknown
	Downstream (approximate)	2H:1V
	Cutoff	Puddled clay wall
	Grout Curtain	Probably none
h.	Water Supply and Blow-Off	
	Water Supply	10-inch pipe
i.	Spillway	
	Type	Paved channel
	Location	Left abutment
	Size	3 ft x 28.5 ft
	Discharge Channel	Rock

SECTION 2
ENGINEERING DATA

2.1 Design.

a. Availability. A summary of the engineering data is presented on the checklist attached as Appendix A. Principal documents containing pertinent data used for this report include the "Report Upon the Park Place Dam No. 3 of the Wyoming Valley Water Supply Company" dated April 8, 1915, and several State inspection reports. In addition, there were several photographs and miscellaneous correpondence located in DER files. Documents pertaining to the design could not be located and are believed not to exist.

b. Design Features. A plan view of the dam and a maximum section obtained by surveying the dam during the field inspection are presented in Appendix E. A summary of the design features is included in Section 1.3.

2.2 Construction.

There is no data available concerning the construction history of this dam and reservoir other than information presented in Section 1.2, paragraph g.

2.3 Operational Data.

There are no operational records maintained for this dam or reservoir.

2.4 Evaluation.

a. Availability. All information presented herein was obtained from records located in the Department of Environmental Resources (DER) files in Harrisburg, Pennsylvania, or from the Owner's representative.

b. Adequacy. The available data included in State files and presented in this report are not adequate to evaluate all of the engineering aspects of this dam.

c. Validity. There is no reason to question the validity of the limited available data.

SECTION 3
VISUAL INSPECTION

3.1 Findings.

a. General. The observations and comments of the field inspection team are contained in the checklist enclosed herein as Appendix B and are summarized and evaluated in the following subsections. In general, the appearance of the facility indicates that the dam is currently in poor condition and not well maintained.

b. Dam. The vertical alignment of the dam crest was checked and the profile is shown on Plate 4, Appendix E. The surveyed crest elevations vary from a low of 1,790.7 to a high of 1,791.6. Since the dam arches downstream, horizontal displacement or slope bulging could not be checked along the crest. However, the downstream slope was very irregular, as shown in Photographs 7 and 8. These irregularities may be attributed to long-term creep movement of the embankment.

Some longitudinal cracking was noted along the downstream and upstream sides of the crest, as shown on Sheet 5a. These cracks do not appear to be deep and may be associated with freeze-thaw cycles. See photographs 9 and 10.

As shown on Sheet 5a, water was located at several places along the downstream toe on the left side of the valve house. The water appears to be coming from the spillway, where leakage occurs through the rocky, poorly defined downstream channel, passing along the toe of the dam. There was no direct evidence of seepage noted through the embankment. However, seepage should not be discounted, as inspection reports dating back as far as the 1930's noted seepage several hundred feet left of the valve house. The seepage noted during this 1979 inspection was traced upslope to the emergency spillway. There was no seepage observed on the right side of the valve house.

c. Appurtenant Structures.

1. Spillway. The spillway is an open channel paved with rock, with up to six inches of sediment noted on the left side of the channel. Grass, brush and trees are growing in the channel. The spillway is considered to be in poor condition.

The discharge channel is judged to be in poor condition. Immediately below the paved spillway, the discharge channel is shallow and not well defined. Even at low

flows, water leaves the channel and flows over and through the rocks toward the toe of the dam, accounting for much, if not all, of the seepage noted along the downstream toe.

2. Outlet Works. The intake system and pipe beneath the dam could not be inspected as they are under water or buried in the embankment. The only items that could be located were two valves inside the valve house. They are deteriorated, rusty and in need of repair. Photographs are shown in Appendix D. The 1915 State report noted three valves, but only two were located during this inspection.

d. Reservoir. Reservoir side slopes are stable, flat to moderate and well vegetated with trees and brush to the water's edge. Sedimentation was assessed to be minimal with no effect on flood water storage capacity.

e. Downstream Channel. The downstream channel appears to be in good condition, steep, well vegetated and narrow. The average channel width is approximately 10 feet with banks about two feet high. The valley gradient is approximately 0.12. About 1,800 feet below the dam are two homes which would be damaged in the event of failure. About 400 feet farther downstream, the tributary enters North Mahanoy Creek where several homes are adjacent to the creek.

3.2 Evaluation.

In summary, the visual survey of the dam disclosed no evidence of insipient failure, but there are signs of downslope creep which indicate possible embankment movement. The longitudinal cracking along the crest appears to be the result of freeze-thaw cycles rather than associated with embankment movement.

Water was noted along the toe, but most of this seepage can be attributed to leakage through the open rock adjacent to the spillway. Since the embankment materials and placement techniques are unknown, it is concluded that additional investigations and evaluations pertaining to seepage and stability should be performed, as described in Section 7.

SECTION 4
OPERATIONAL PROCEDURES

4.1 Procedures.

Normal conditions do not require a dam tender. Water is gravity fed through a 10-inch pipe into an eight-inch water supply pipe. The 10-inch line, below the eight-inch branch, is the pond drain. It is not known how often the pond drain or water supply valves are exercised. Excess water is discharged over the spillway.

4.2 Maintenance of the Dam.

There is little evidence of routine maintenance of this structure. The spillway has brush and trees growing in it, trees and brush are growing on the embankment slope, and the crest is uneven.

4.3 Maintenance of Operating Facilities.

Similar to dam maintenance, there is very little evidence indicating routine maintenance of the operating facilities. There is no evidence that the valves have been lubricated recently.

4.4 Warning Systems In Effect.

There are no formal warning systems or procedures established to be followed during periods of exceedingly heavy rainfall.

4.5 Evaluation.

There are no written operating procedures, maintenance procedures or warning systems. These procedures should be developed which should include a checklist of items to be observed, operated and inspected on a regular basis. Since a warning procedure does not exist, a formal procedure should be developed and implemented during periods of exceedingly heavy rainfall. This procedure should include a detailed method of monitoring the dam and pool levels, as the available freeboard for this reservoir is very small.

SECTION 5
HYDROLOGY/HYDRAULICS

5.1 Evaluation of Features.

a. Design/Evaluation Data. There is no design data for the existing spillway. The spillway capacity was evaluated as a part of the 1915 report made by the State of Pennsylvania. Hydrologic and hydraulic evaluations made as a part of this 1979 investigation are contained in Appendix C.

The watershed is a small, mountaintop watershed approximately 0.7 miles long and about 0.4 miles wide, having a total area of 0.27 square miles. Elevations range from a high of 1,945± to normal pool elevation of 1,789. The watershed is completely wooded with no residential development and runoff characteristics are not likely to change.

The 1915 report evaluated the spillway as a weir with a coefficient of discharge of 2.8, a maximum capacity of 230 cfs or 850 cfs per square mile, "sufficient to care for any probable flood".

In accordance with criteria established by the Federal (OCE) Guidelines, the recommended spillway design flood for this "Small" size dam with a "High" hazard potential classification is 0.5 to 1.0 PMF (Probable Maximum Flood).

b. Experience Data. No reservoir level records are maintained. No estimate was available of previous high reservoir elevations. The closest rain gauging station is located about 1.5 miles away at the Mahanoy Township Water Authority's Reservoir No. 1. A frequent storm of record for this part of the state occurred June 1972, Tropical Storm Agnes. Consecutive 24-hour rainfalls reported at Mahanoy Township's Reservoir No. 1 are 3.57 and 5.10 inches. The 5.10 inches of rainfall was assessed to represent 17 to 19 percent of the PMF; see Appendix C.

c. Visual Observations. The most important observation indicating a reduction in spillway capacity is the condition of the spillway. At the entrance to the channel, a line of small rocks have been placed which raises the normal reservoir level by one or two inches.

The spillway channel appears to have been paved with block. However, except for the narrow channel along the right spillway wall, the spillway has silted in with up to six inches of sediment. Brush and trees are also growing in the

channel, reducing its capacity. Other observations regarding the condition of the downstream channel, spillway and reservoir are located in Appendix B and discussed in Section 3.

d. Overtopping Potential. The overtopping potential of this dam was estimated using "HEC-1, Dam Safety Version", computer program. A brief description of the program is included in Appendix C. Calculations indicate that the maximum spillway capacity is about 165 cfs when the reservoir level is at the minimum crest elevation. The HEC-1 computed peak PMF inflow is 1,027 cfs. The spillway passes about 19 percent of the PMF without overtopping the dam.

e. Spillway Adequacy. The spillway is rated as "Seriously Inadequate" as all of the following criteria are met:

1. The spillway will not pass 50 percent of the PMF without overtopping the dam.

2. Overtopping will cause dam failure.

3. There will be a significant increase in property damage and potential for loss of life as a result of failure by overtopping.

The overtopping potential is discussed in the above paragraph. As discussed in this report, the embankment materials and quality of construction is unknown; therefore, the embankment is conservatively assessed to fail if overtopped by one foot or for more than one hour. The increase in hazard is discussed in the following paragraph.

f. Downstream Conditions. About 1,800 feet below the dam are two homes which may be affected by failure of the dam. About 400 feet farther downstream, the stream enters North Mahanoy Creek after passing under a highway and a railroad. Computed maximum water levels at the first downstream homes indicate a 1.4 foot increase resulting from failure during the PMF over nonfailure during the PMF. It should be noted that downstream water surface elevations included in Appendix C are based on the storm centered over Park Place Watershed only. Approximately one mile downstream of the confluence are five homes built adjacent to the creek at Shoemakers. During Tropical Storm Agnes, at least one house was partially flooded. During the 0.5 PMF, these homes would all be flooded and the flood wave resulting from failure is judged to significantly increase property damage and potential for loss of life.

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability.

a. Visual Observations. Visual observations indicate an embankment that may be marginally stable. This is based on evidence of long-term downstream slope movement, steep slopes and slope bulging. Longitudinal cracking along the crest was also observed and is probably associated with freeze-thaw cycles, but cannot be discounted as evidence of embankment movement without further investigation. In its present state, the dam is considered to be in a noncritical unsafe condition. As discussed in Appendix B and Section 3, clear seepage was observed along the toe of the embankment. Most, if not all, of this seepage can be attributed to leakage from the spillway which filters through the rock and then along the toe of the dam. However, embankment seepage should not be discounted without further monitoring. There is woody vegetation on the upstream and downstream slopes, which should be removed.

The spillway is considered to be in poor condition, containing sediment and vegetation, and is in a general state of neglect. Similarly, the water supply system appears to be neglected and the valves not properly maintained, lubricated or cleaned. The serviceability of the valves is highly questionable.

b. Design and Construction Data. No design or construction data are known to exist, except for information presented in Section 1.2, paragraph g. All data concerning physical features are limited to physical dimensions of the dam taken during the field inspection and are, therefore, inadequate for detailed evaluation of the dam. Elevations of the water supply pipe were obtained from a preliminary design drawing dated December 1909.

c. Operating Procedures. No operating procedures currently exist.

d. Post-Construction Changes. There have been no records of any reported major changes made to this dam or its appurtenances since it was built in 1909.

e. Embankment Stability. There were no embankment stability evaluations located in the files. Visual inspection revealed vegetation and possible downslope movement as well as longitudinal cracking along the crest which may be indicative of a marginally stable embankment. Recommendations pertaining

to stability studies and seepage assessments are presented in Section 7.

f. Seismic Stability. The dam is located in Seismic Zone 1. Normally it can be considered that if a dam in this zone is stable under static loading conditions, it can be assumed safe for any expected earthquake conditions. Since the static factor of safety for this embankment is unknown and at best marginal, a seismic stability evaluation could not be made.

SECTION 7
ASSESSMENT/REMEDIAL MEASURES

7.1 Dam Assessment.

a. Evaluation. On the basis of the visual inspection, the dam is judged to be in poor condition and should be considered as a noncritical unsafe dam. There are no engineering or construction data available other than information obtained from the field inspection and from the 1915 document describing the dam and appurtenant facilities.

The outlet systems are considered "marginal" and the spillway is considered to be "Seriously Inadequate" using the Corps of Engineers criteria as discussed in Section 5.

b. Adequacy of Information. Insufficient engineering and construction data were found to adequately evaluate the stability of the dam and serviceability of the outlet works. Specifically, there is no substantial data describing the embankment material or internal geometry of the embankment. There is no evidence of an internal drainage system. Foundation preparation details are also very scarce and records indicate that materials were not compacted by rollers.

c. Urgency. Recommendations considered to be critical in Section 7.2 should be implemented immediately. Other items should be implemented as soon as practical.

d. Necessity of Additional Studies. It is judged that additional investigations pertaining to stability of the embankment should be performed which would include seepage analysis, slope stability analysis and other recommendations presented in Section 7.2.

7.2 Remedial Measures.

a. Facilities. The following remedial work is considered to be critical and should be performed immediately. All work should be performed under the supervision of a registered professional engineer experienced in the design of dams.

1. A geotechnical investigation and evaluation of this structure should be performed. This investigation should include the installation of piezometers or observation wells to determine the location of the phreatic surface for use in stability analysis.

2. The source of seepage along the toe should be investigated. The seepage should be collected and monitored for turbidity and changes in rates of seepage.

3. The spillway system should be reconstructed to meet current hydrologic/hydraulic criteria as determined from a detailed hydrologic/hydraulic analysis using state-of-the-art information.

4. The pond drain system should be thoroughly tested and the valves rehabilitated to insure that the reservoir can be drained in the event of an emergency.

5. The pond drain should have provisions for upstream emergency closure.

Other work to be performed during scheduled maintenance includes the removal of trees and other vegetation from the slopes of the embankment and in the spillway area.

b. Operation and Maintenance Procedures. Formal maintenance and warning procedures should be developed and implemented for this facility. The warning procedure should include observing the dam and spillway during periods of unusually heavy rain and methods of warning downstream residents that high flows are to be expected. If necessary, evacuation procedures should also be developed and implemented as necessary.

The Owner should develop an inspection checklist as an amendment to the maintenance procedure to insure that all critical items are periodically inspected and maintained.

APPENDIX

A

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM *Park Place Dam #3*

ID # *PA 00682*

ITEM	REMARKS
AS-BUILT DRAWINGS	*None available.*
REGIONAL VICINITY MAP	*See Plate 1, Appendix E.*
CONSTRUCTION HISTORY	*See Section 1 of report.*
TYPICAL SECTIONS OF DAM	*See Appendix E for data obtained during 1979.*
OUTLETS - PLAN	*Not available.*
DETAILS	
CONSTRAINTS	
DISCHARGE RATINGS	*- Not available*
RAINFALL/RESERVOIR RECORDS	*- None*

ITEM	REMARKS
DESIGN REPORTS	*None - See Section 1 of text.*
GEOLOGY REPORTS	*None. See Appendix F for data obtained for this 1979 inspection.*
DESIGN COMPUTATIONS	*See Appendix C.*
HYDROLOGY & HYDRAULICS	*Not available.*
DAM STABILITY	
SEEPAGE STUDIES	
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	*Unknown.*
POST-CONSTRUCTION SURVEYS OF DAM	*Unknown.*
BORROW SOURCES	*Unknown.*

ITEM	REMARKS
MONITORING SYSTEMS	*None.*
MODIFICATIONS	*Unknown.*
HIGH POOL RECORDS	*None.*
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	*None.*
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	*Unknown.*
MAINTENANCE OPERATION RECORDS	*None available.*

ITEM	REMARKS
SPILLWAY PLAN SECTIONS DETAILS	*See Appendix E for data obtained during 1979 inspection.*
OPERATING EQUIPMENT PLANS & DETAILS	*Not available.*
MISCELLANEOUS	1. *"Report Upon the Park Place Dam No. 3 of the Wyoming Valley Water Supply Compnay", dated April 8, 1915.* 2. *Inspection Reports by the State of Pennsylvania through 1971.*

APPENDIX

B

CHECK LIST
VISUAL INSPECTION
PHASE I

Name Dam *Park Place Dam No. 3* County *Schuylkill* State *Pennsylvania* National ID # *PA 00682*

Type of Dam *Earth* Hazard Category *I-High*

Date(s) Inspection *10 April 1979* Weather *Clear and Cool* Temperature *40's*

Pool Elevation at Time of Inspection *1789* M.S.L. Tailwater at Time of Inspection *N/A* M.S.L.

Inspection Personnel:

John Boschuk, Jr. (Geotechnical)
Mary F. Beck (Hydrologist)
John H. Frederick, Jr. (Geotechnical)
Vincent McKeever (Hydraulics)
Raymond Lambert (Geologist)
Ronald Marucci (Survey)

John Boschuk, Jr. Recorder

Remarks:

Mr. Robert Zientek, Manager, provided assistance to the inspection team at his office.

CONCRETE/MASONRY DAMS

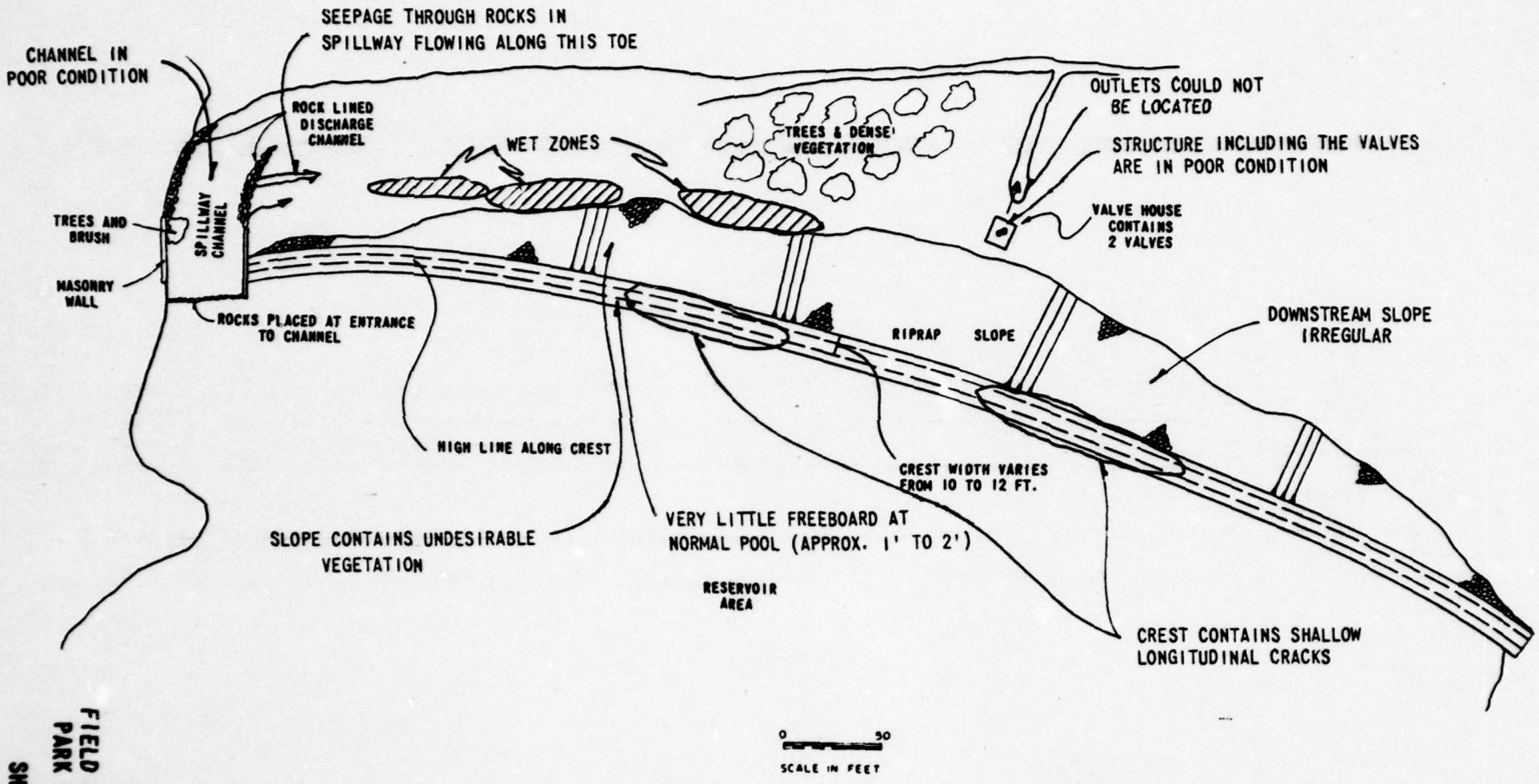
VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	*N/A*	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	*N/A*	
DRAINS	*N/A*	
WATER PASSAGES	*N/A*	
FOUNDATION	*N/A*	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	*N/A*	
STRUCTURAL CRACKING	*N/A*	
VERTICAL AND HORIZONTAL ALIGNMENT	*N/A*	
MONOLITH JOINTS	*N/A*	
CONSTRUCTION JOINTS	*N/A*	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	*Yes. Some longitudinal cracking was noted along the downstream and upstream sides of the crest as shown on Sheet 5a. These cracks do not appear to be deep and may be associated with freeze-thaw cycles.*	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	*None observed.*	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	*None observed.*	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	*Horizontal and vertical alignment was checked and found to be reasonably good with no significant vertical undulation or abrupt or unusual horizontal movements.*	
RIPRAP FAILURES	*No failures were observed but the slope is non-uniform both longitudinally and perpendicular to the centerline. Long-term movement of the slope is obvious.*	



FIELD OBSERVATION PLAN
PARK PLACE DAM NO. 3

SHEET 5A OF 11

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	*Good condition but slopes are covered with vegetation.*	
ANY NOTICEABLE SEEPAGE	*See Sheet 5a.*	
STAFF GAGE AND RECORDER	*None*	
DRAINS	*None found.*	

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	*Could not be observed.*	
INTAKE STRUCTURE	*Under water.*	
OUTLET STRUCTURE	*Only the valves could be found in the deteriorated valve house. See photographs in Appendix D. The 8 inch pipe is buried and could not be located.*	
OUTLET CHANNEL	*None*	
EMERGENCY GATE	*None*	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	*None. Open channel probably paved with rock. Up to six inches of sediment on left side of channel, vegetation and trees growing in channel. Apparently rocks have been placed at the entrance to the channel which reduce discharge and raise reservoir level slightly.*	
APPROACH CHANNEL	*Fair condition with sediment and vegetation in channel.*	
DISCHARGE CHANNEL	*Poor condition. Channel contains dense vegetation and the walls of the channel are of questionable structural stability. Immediately below the dam the channel is shallow and not defined, even at low flows water leaves the channel and flows over and through the rock toward the toe of the dam. The channel should be rehabilitated.*	
BRIDGE AND PIERS	*None*	

GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	*N/A*	
APPROACH CHANNEL	*N/A*	
DISCHARGE CHANNEL	*N/A*	
BRIDGE AND PIERS	*N/A*	
GATES AND OPERATION EQUIPMENT	*N/A*	

INSTRUMENTATION

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	*None*	
OBSERVATION WELLS	*None*	
WEIRS	*None*	
PIEZOMETERS	*None*	
OTHER	*None*	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	*Reservoir side slopes are flat to moderate, well vegetated with trees and brush to water's edge. Some debris is on reservoir slopes which will enter the reservoir.*	
SEDIMENTATION	*Minimal sedimentation, no effect on flood water storage.*	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	*The downstream channel is about 10 feet wide, with banks about two feet high. The valley is narrow with steep sides and completely wooded.*	
SLOPES	*The valley gradient is about 0.12.*	
APPROXIMATE NO. OF HOMES AND POPULATION	*About 1800 feet below the dam are two houses which would be damaged in the event of failure. About 400 feet further downstream, the tributary enters North Mahanoy Creek. Several houses are built adjacent to North Mahanoy Creek which have been flooded in the past.*	

APPENDIX

C

PARK PLACE DAM NO. 3

CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: *Mountain top, 100% wooded.*

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): *1789 feet * (109 Acre-Feet).*

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): *1790.7 feet (126 Acre-Fee*

ELEVATION MAXIMUM DESIGN POOL: -------

ELEVATION TOP DAM: *1790.7 feet minimum crest elevation.*

SPILLWAY

a. Elevation *1789 feet.*

b. Type *Channel, probably paved under sediment, trees and brush.*

c. Width *28.5 feet.*

d. Length *Not clearly defined.*

e. Location Spillover *Left abutment.*

f. Number and Type of Gates *None.*

OUTLET WORKS:

a. Type *10 inch CIP.*

b. Location *Base of dam.*

c. Entrance inverts ----

d. Exit inverts ----

e. Emergency draindown facilities *10 inch CIP.*

HYDROMETEOROLOGICAL GAGES:

a. Type *None within drainage area.*

b. Location *None available.*

c. Records *None available.*

MAXIMUM NON-DAMAGING DISCHARGE: *Unknown.*

** All elevations are based on spillway elevation of 1789 feet taken from USGS map*

HEC-1, REVISED
FLOOD HYDROGRAPH PACKAGE

The original "Flood Hydrograph Package" (HEC-1), developed by the Hydrologic Engineering Center, Corps of Engineers, has been modified for use under the National Dam Inspection Program. The "Flood Hydrograph Package (HEC-1), Dam Safety Version", hereinafter referred to as, HEC-1, Rev., has been modified to require less detailed input and to include a dam breach analysis. The required input is obtained from the field inspection of a dam, any available design/evaluation data, relatively simple hydraulic calculations, or information from the USGS Quandrangle maps. The input format is flexible in order to reflect any unique characteristics of an individual dam.

HEC-1, Rev. computes a reservoir inflow hydrograph based on individual watershed characteristics such as: area, percentage of impervious surface area, watershed shape, and hydrograph characteristics determined from regional correlation studies by the Corps of Engineers, Baltimore District. The inflow is routed through the reservoir using spillway discharge data obtained from the field inspection or design data. Flood storage capacity is determined from USGS maps or design information and verified by the field inspection. In the event a spillway cannot discharge 0.5 PMF without overtopping and failure of the dam, downstream channel characteristics obtained from the field inspection and USGS maps are inputed and flows are routed downstream to the damage center and a dam breach analysis is performed.

Included in this Appendix are the HEC-1, Rev. pertinent input values and a summary print-out tables.

BY MFB DATE 5/3/79 SUBJECT SHEET 3 OF 13
CHKD. BY DATE 5/14/79 Park Place Dam No. 3 JOB No.
Hydrology / Hydraulics

Classification (Ref. Recommended Guidelines for Safety Inspection of Dams)

1. The hazard potential classification is "High" as failure would result in loss of life.

2. The size classification is "Small" based on its 32±ft. height and 126 Ac-Ft maximum storage capacity

3. The spillway design flood, based on size and hazard classification, is 0.5 to 1.0 PMF (Probable Maximum Flood).

Hydrology and Hydraulic Analysis

1. The 1915 State report evaluated the spillway as a weir (C=2.8) with a maximum capacity of 230 cfs.

2. Evaluation of the structure was by use of the computer program. Computer input as follows:

Inflow hydrograph
rainfall, shown on sheet 6, ref. Hydrometeorological Report No. 40. Because of the small drainage area, no point rainfall reduction factor was used.
drainage area, determined from USGS map is 0.27 sq. miles
Snyder's hydrograph parameters, t_p & C_p

$t_p = C_t (L \cdot L_{ca})^{0.3}$

$C_t = 1.85$ } Information received from Corps of
$C_p = 0.50$ } Engineers, Baltimore, for Zone 13.
$L = 0.69$ miles } from USGS
$L_{ca} = 0.30$ miles } maps

$t_p = 1.85(0.69 \cdot 0.30)^{0.3} = 1.15$

Reservoir routing
elevation - storage, shown on sheet 7
normal storage volume reported by owner
flood storage taken from USGS map

elevation-discharge, shown on sheet 7
the spillway is a paved channel with brush and trees, estimated $n = 0.065$. See Photos 3 & 4

width = 28.5 ft
depth = 3.0 ft
slope ~ 0.023
} from field survey

determine velocity and flow in channel by Manning's equation:

$$v = \frac{1.49}{n}\left(\frac{b \cdot d}{b+2d}\right)^{2/3} s^{1/2}$$

$$Q = b \cdot d \cdot v$$

$$\text{reservoir level} = 1789 + d + \frac{v^2}{2g}$$

d_n	v_n	$\frac{v_n^2}{2g}$	Q	Reservoir Level
0	0	0	0	1789.0
0.5	2.14	0.07	30.5	1789.6
1	3.32	0.17	94.6	1790.2
3	6.37	0.63	544.6	1792.6
6	9.08	1.28	1532.7	1796.3
10	11.32	1.99	3226.2	1801.0

crest profile from field survey entered

Overtopping potential - as shown on sheet 11, the dam is overtopped by 0.12PMF but not 0.1 PMF, or is overtopped by about 0.19 PMF

Two assumed failure shapes are included, see sheets 12 & 13.

Weather Service Publications indicate consecutive 24-hr rainfalls (recorded about 1.5 miles from the dam) during June 1972 (Tropical Storm Agnes) of 0.17, 3.57, 5.10 & 0.28 inches. The 5.1 inches represents about 0.17 PMP. If the 5.1 inches is assumed to have fallen within 6 hours, it would represent about 0.19 PMP

The spillway is rated as "Seriously Inadequate" as the following criteria is satisfied: (ref. ETL 1110-2-234, 10 May 1978)

1. The dam will not pass 0.5 PMF w/o overtopping
2. The dam will fail as a result of overtopping
3. Failure will significantly increase the hazard to loss of life downstream

MFB 5/9/79 Park Place Dam No. 3 SH. 5 OF 13

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	IN
ROUTE HYDROGRAPH TO	OUT
ROUTE HYDROGRAPH TO	DS
ROUTE HYDROGRAPH TO	HW
END OF NETWORK	

1**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79
****

RUN DATE= 79/05/09.
TIME= 09.55.28.

PARK PLACE DAM NO. 3
OVERTOPPING ANALYSIS
NAT ID NO. PA00682 DER NO. 54-12

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
150	0	20	0	0	0	0	0	-4	0
			JOPER	NWT	LROPT	TRACE			
			5	0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 3 NRTIO= 6 LRTIO= 1

RTIOS=	.10	.20	.30	.50	.80	1.00

MFB 5/9/79 Park Place Dam No. 3 SW. 6 of 13

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
IN	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	.27	0.00	.27	1.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.40	117.00	127.00	136.00	143.00	145.00	0.00

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 1.15 CP= .50 NTA= 0

RECESSION DATA

STRTQ= -1.50 QRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH 27 END-OF-PERIOD ORDINATES, LAG= 1.14 HOURS, CP= .50 VOL= 1.00

10.	37.	65.	74.	65.	52.	42.	34.	28.	22.
18.	14.	12.	9.	8.	6.	5.	4.	3.	3.
2.	2.	1.	1.	1.	1.	1.			

END-OF-PERIOD FLOW

0

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	32.48	29.76	2.72	15961.
										(825.)	(756.)	(69.)	(451.97)

MFB 5/9/79 Park Place Dam No. 3 SH 7 OF 13

HYDROGRAPH ROUTING

OUTFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
OUT	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1789.	-1

STAGE	1789.00	1789.60	1790.20	1790.80	1791.40	1792.60	1793.80	1796.30	1801.00
FLOW	0.00	30.00	95.00	182.00	288.00	544.00	846.00	1553.00	3226.00
CAPACITY=	0.	6.	109.	222.					
ELEVATION=	1759.	1770.	1789.	1800.					

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1789.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1790.2	0.0	0.0	0.

CREST LENGTH	0.	105.	190.	525.	700.
AT OR BELOW ELEVATION	1790.2	1790.9	1791.0	1791.5	1792.0

MFB 5/9/79 Park Place Dam No. 3 SH. 8 of 13

HYDROGRAPH ROUTING

SECTION 250 FT BELOW DAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
DS	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPNP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.0650	.0650	.0650	1700.0	1724.0	1750.	.14300

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

0.00 1724.00 100.00 1704.00 102.00 1700.00 112.00 1700.10 114.00 1702.00
214.00 1700.00 314.00 1707.80 390.00 1724.00

STORAGE	0.00	2.55	8.95	16.77	25.54	35.45	46.51	58.53	71.17	84.44
	98.33	112.84	127.97	143.73	160.10	177.10	194.71	212.95	231.81	251.29
OUTFLOW	0.00	428.51	2560.85	6859.58	12998.96	21055.99	31115.97	43709.60	58440.04	75201.76
	94002.94	114860.75	137798.39	162843.35	190026.19	219379.69	250938.30	284737.72	320814.56	359206.12
STAGE	1700.00	1701.26	1702.53	1703.79	1705.05	1706.32	1707.58	1708.84	1710.11	1711.37
	1712.63	1713.89	1715.16	1716.42	1717.68	1718.95	1720.21	1721.47	1722.74	1724.00
FLOW	0.00	428.51	2560.85	6859.58	12998.96	21055.99	31115.97	43709.60	58440.04	75201.76
	94002.94	114860.75	137798.39	162843.35	190026.19	219379.69	250938.30	284737.72	320814.56	359206.12

MFB 5/9/79 Park Place Dam No. 3 Sh. 9 of 13

HYDROGRAPH ROUTING

SECTION AT HIGHWAY

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
HW	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.0550	.0550	.0550	1580.0	1610.0	400.	.06700

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

0.00 1610.00 21.00 1588.50 31.00 1587.50 35.00 1580.00 39.50 1580.00
50.70 1587.50 200.00 1600.00 210.00 1610.00

STORAGE	0.00	.09	.22	.40	.63	.92	1.54	2.48	3.71	5.23
	7.05	9.17	11.59	14.28	17.08	19.92	22.80	25.74	28.71	31.73
OUTFLOW	0.00	70.01	249.29	553.21	1002.35	1663.04	2911.21	4956.69	7974.49	12140.02
	17617.84	24563.24	33123.72	43982.65	57673.66	72998.94	89885.67	108276.58	128125.55	149394.69
STAGE	1580.00	1581.58	1583.16	1584.74	1586.32	1587.89	1589.47	1591.05	1592.63	1594.21
	1595.79	1597.37	1598.95	1600.53	1602.11	1603.68	1605.26	1606.84	1608.42	1610.00
FLOW	0.00	70.01	249.29	553.21	1002.35	1663.04	2911.21	4956.69	7974.49	12140.02
	17617.84	24563.24	33123.72	43982.65	57673.66	72998.94	89885.67	108276.58	128125.55	149394.69

MFB 5/9/79 Park Place Dam No. 3 SH. 10 OF 13

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

Plan. 1, overtopping - no failure. Plans 2 & 3. overtopping w/ failure

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS					
				RATIO 1 .10	RATIO 2 .20	RATIO 3 .30	RATIO 4 .50	RATIO 5 .80	RATIO 6 1.00
HYDROGRAPH AT	IN	.27	1	103.	205.	308.	513.	821.	1027.
	(	.70)	(	2.91)(	5.82)(	8.72)(	14.54)(	23.26)(	29.08)(
			2	103.	205.	308.	513.	821.	1027.
			(	2.91)(	5.82)(	8.72)(	14.54)(	23.26)(	29.08)(
			3	103.	205.	308.	513.	821.	1027.
			(	2.91)(	5.82)(	8.72)(	14.54)(	23.26)(	29.08)(
ROUTED TO	OUT	.27	1	81.	173.	296.	508.	819.	1025.
	(	.70)	(	2.28)(	4.89)(	8.39)(	14.39)(	23.19)(	29.04)(
			2	81.	173.	296.	990.	1343.	1617.
			(	2.28)(	4.89)(	8.39)(	28.03)(	38.03)(	45.80)(
			3	81.	173.	296.	962.	1358.	1452.
			(	2.28)(	4.89)(	8.39)(	27.23)(	38.46)(	41.12)(
ROUTED TO	DS	.27	1	81.	173.	293.	515.	819.	1023.
	(	.70)	(	2.28)(	4.89)(	8.31)(	14.54)(	23.19)(	28.97)(
			2	81.	173.	293.	994.	1338.	1617.
			(	2.28)(	4.89)(	8.31)(	28.16)(	37.89)(	45.79)(
			3	81.	173.	293.	954.	1354.	1460.
			(	2.28)(	4.89)(	8.31)(	27.01)(	38.34)(	41.34)(
ROUTED TO	HU	.27	1	81.	173.	293.	512.	817.	1023.
	(	.70)	(	2.28)(	4.89)(	8.31)(	14.50)(	23.14)(	28.97)(
			2	81.	173.	293.	997.	1339.	1620.
			(	2.28)(	4.89)(	8.31)(	28.23)(	37.91)(	45.88)(
			3	81.	173.	293.	958.	1355.	1461.
			(	2.28)(	4.89)(	8.31)(	27.13)(	38.36)(	41.36)(

Overtopping - No Failure

MFB 5/9/79 Park Place Dam No. 3 Sh. 11 of 13

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1789.00	1789.00	1790.70
STORAGE	109.	109.	126.
OUTFLOW	0.	0.	167.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.10	1790.07	0.00	120.	81.	0.00	42.00	0.00
.20	1790.73	.03	127.	173.	1.00	41.67	0.00
.30	1791.09	.39	130.	296.	3.33	41.00	0.00
.50	1791.33	.63	133.	508.	5.33	40.67	0.00
.80	1791.55	.85	135.	819.	7.00	40.67	0.00
1.00	1791.66	.96	136.	1025.	7.67	40.67	0.00

250 ft. downstream

PLAN 1 STATION DS

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.10	81.	1700.2	42.00
.20	173.	1700.5	41.67
.30	293.	1700.9	41.00
.50	513.	1701.3	40.67
.80	819.	1701.5	40.67
1.00	1023.	1701.6	40.67

at highway

PLAN 1 STATION HW

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.10	81.	1581.7	42.00
.20	173.	1582.5	41.67
.30	293.	1583.4	41.00
.50	512.	1584.5	40.67
.80	817.	1585.7	40.67
1.00	1023.	1586.4	40.67

MFB 5/9/79 Park Place Dam No. 3 Sh. 12 of 13

DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	WSEL	FAILEL
0.	.50	1762.00	3.00	1789.00	1791.20

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1789.00	1789.00	1790.70
STORAGE	109.	109.	126.
OUTFLOW	0.	0.	167.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.10	1790.07	0.00	120.	81.	0.00	42.00	0.00
.20	1790.73	.03	127.	173.	1.00	41.67	0.00
.30	1791.09	.39	130.	296.	3.33	41.00	0.00
.50	1791.31	.61	133.	990.	2.50	42.33	40.33
.80	1791.42	.72	134.	1349.	3.11	41.61	39.67
1.00	1791.30	.60	133.	1650.	2.89	41.06	39.00

250 ft. downstream

PLAN 2 STATION DS

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.10	81.	1700.2	42.00
.20	173.	1700.5	41.67
.30	293.	1700.9	41.00
.50	994.	1701.6	42.33
.80	1338.	1701.8	41.67
1.00	1617.	1702.0	41.33

at highway

PLAN 2 STATION HW

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.10	81.	1581.7	42.00
.20	173.	1582.5	41.67
.30	293.	1583.4	41.00
.50	997.	1586.3	42.33
.80	1339.	1587.1	41.67
1.00	1620.	1587.8	41.33

NFB 5/1/79 Park Place Dam No. 3 SH 13 of 13

DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	WSEL	FAILEL
20.	.50	1770.00	3.00	1789.00	1791.20

PLAN 3 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1789.00	1789.00	1790.70
STORAGE	109.	109.	126.
OUTFLOW	0.	0.	167.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.10	1790.07	0.00	120.	81.	0.00	42.00	0.00
.20	1790.73	.03	127.	173.	1.00	41.67	0.00
.30	1791.09	.39	130.	296.	3.33	41.00	0.00
.50	1791.28	.58	132.	1014.	1.94	41.44	40.33
.80	1791.29	.59	133.	1368.	2.44	40.94	39.67
1.00	1791.25	.55	132.	1460.	2.00	40.83	39.00

250 ft. downstream

PLAN 3 STATION DS

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.10	81.	1700.2	42.00
.20	173.	1700.5	41.67
.30	293.	1700.9	41.00
.50	954.	1701.6	41.67
.80	1354.	1701.8	41.00
1.00	1460.	1701.9	40.67

at highway

PLAN 3 STATION HW

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.10	81.	1581.7	42.00
.20	173.	1582.5	41.67
.30	293.	1583.4	41.00
.50	958.	1586.2	41.67
.80	1355.	1587.2	41.00
1.00	1461.	1587.4	40.67

APPENDIX

D

VALVE HOUSE AT DOWNSTREAM TOE OF
EMBANKMENT.

PHOTOGRAPH NO. 1

VIEW INSIDE VALVE HOUSE. NOTE
EXPOSED AND UNPROTECTED VALVES.

PHOTOGRAPH NO. 2

APPROACH CHANNEL TO SPILLWAY LOOKING
DOWNSTREAM FROM LEFT ABUTMENT.

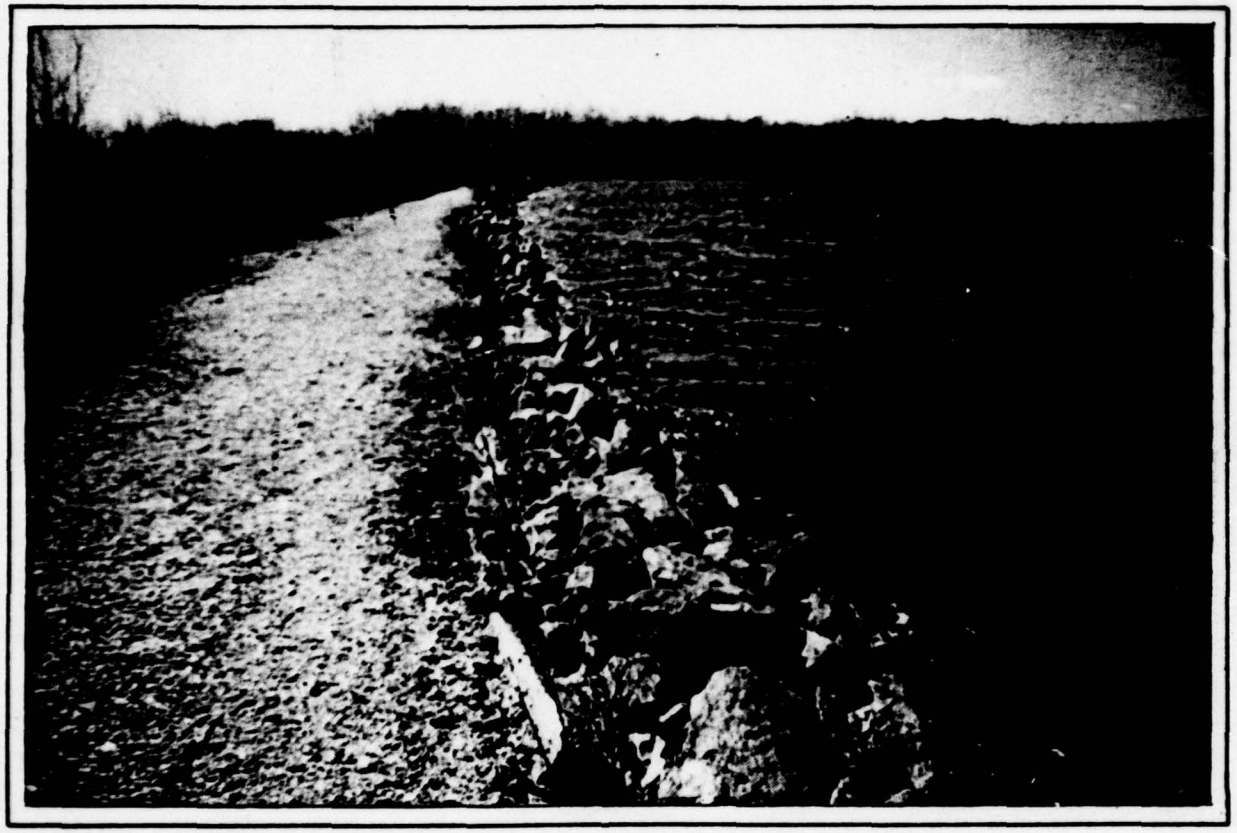
PHOTOGRAPH NO. 3

VIEW LOOKING ACROSS CONTROL SECTION
OF SPILLWAY FROM RIGHT ABUTMENT OF
SPILLWAY.

PHOTOGRAPH NO. 4

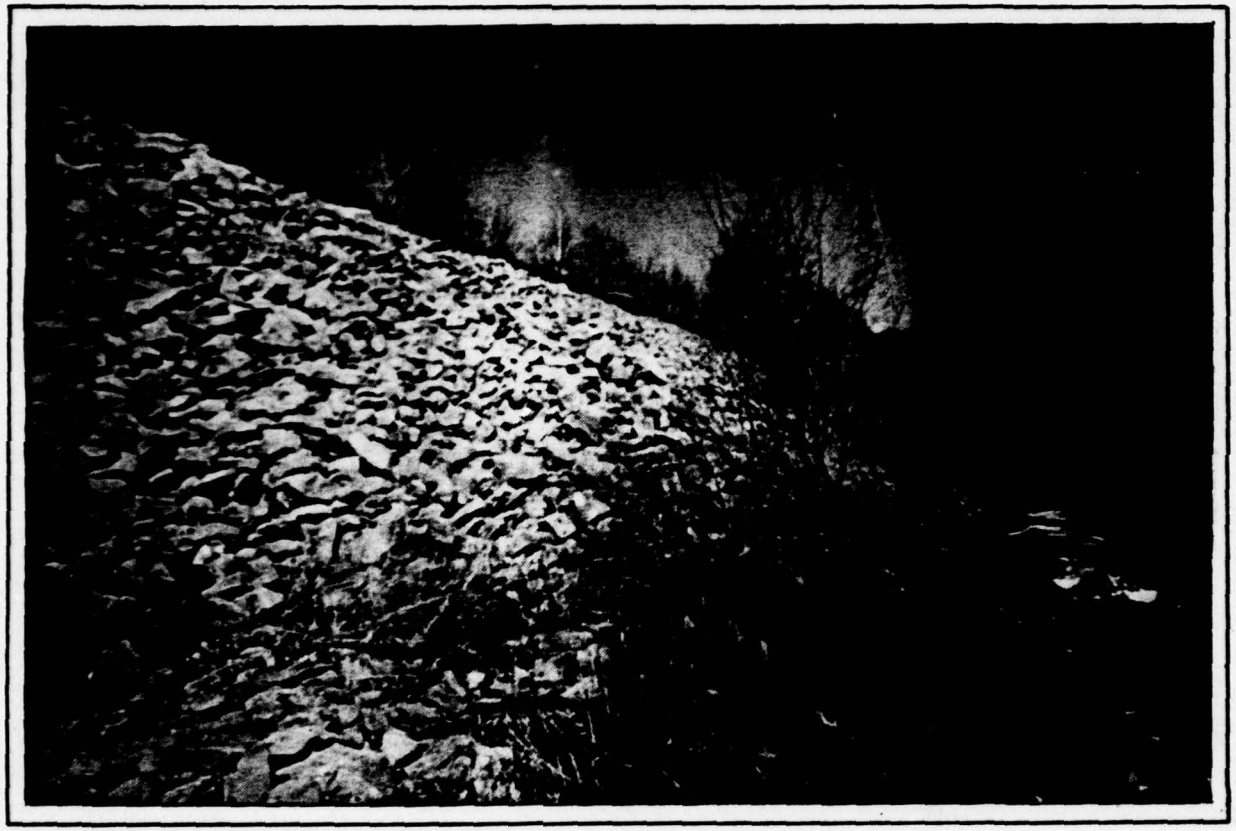
VIEW LOOKING DOWN CENTERLINE OF
SPILLWAY.

PHOTOGRAPH NO. 5



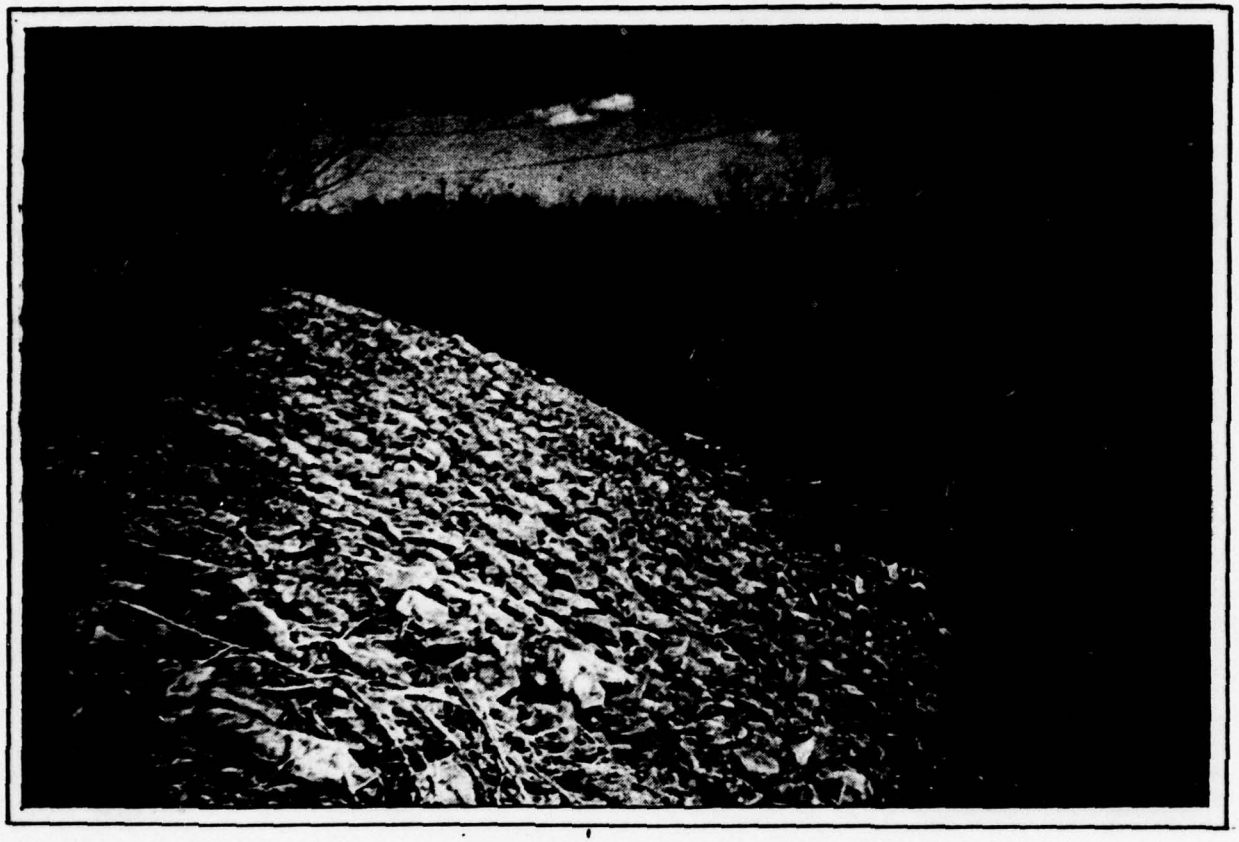
TYPICAL VIEW OF UPSTREAM SLOPE AND CREST.

PHOTOGRAPH NO. 6



TYPICAL VIEW OF DOWNSTREAM SLOPE.

PHOTOGRAPH NO. 7

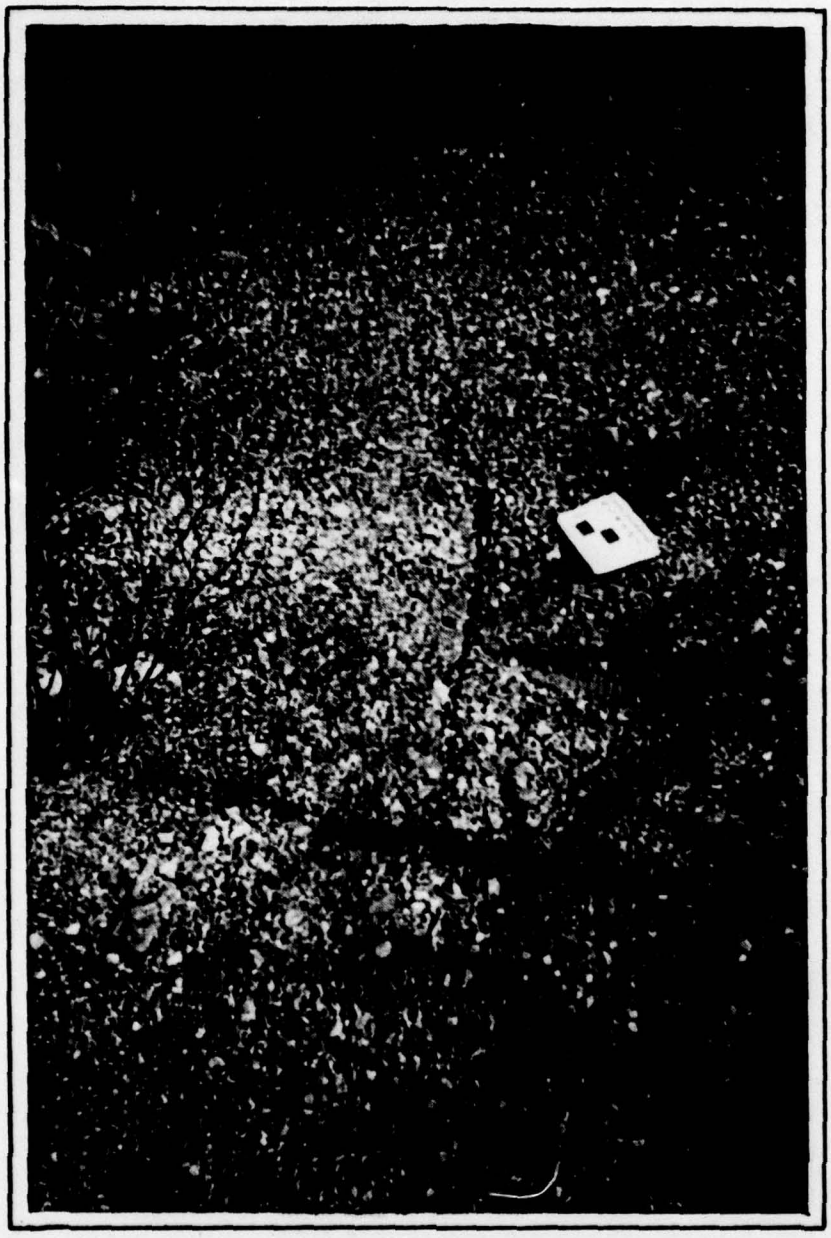


ALTERNATE VIEW OF DOWNSTREAM SLOPE.

PHOTOGRAPH NO. 8

TYPICAL SURFICIAL LONGITUDINAL
CRACK ALONG CREST.

PHOTOGRAPH NO. 9



TYPICAL SURFICIAL LONGITUDINAL
CRACK ALONG CREST.

PHOTOGRAPH NO. 10

STANDING WATER ALONG THE DOWNSTREAM
TOE IN THE ACCESS ROAD.

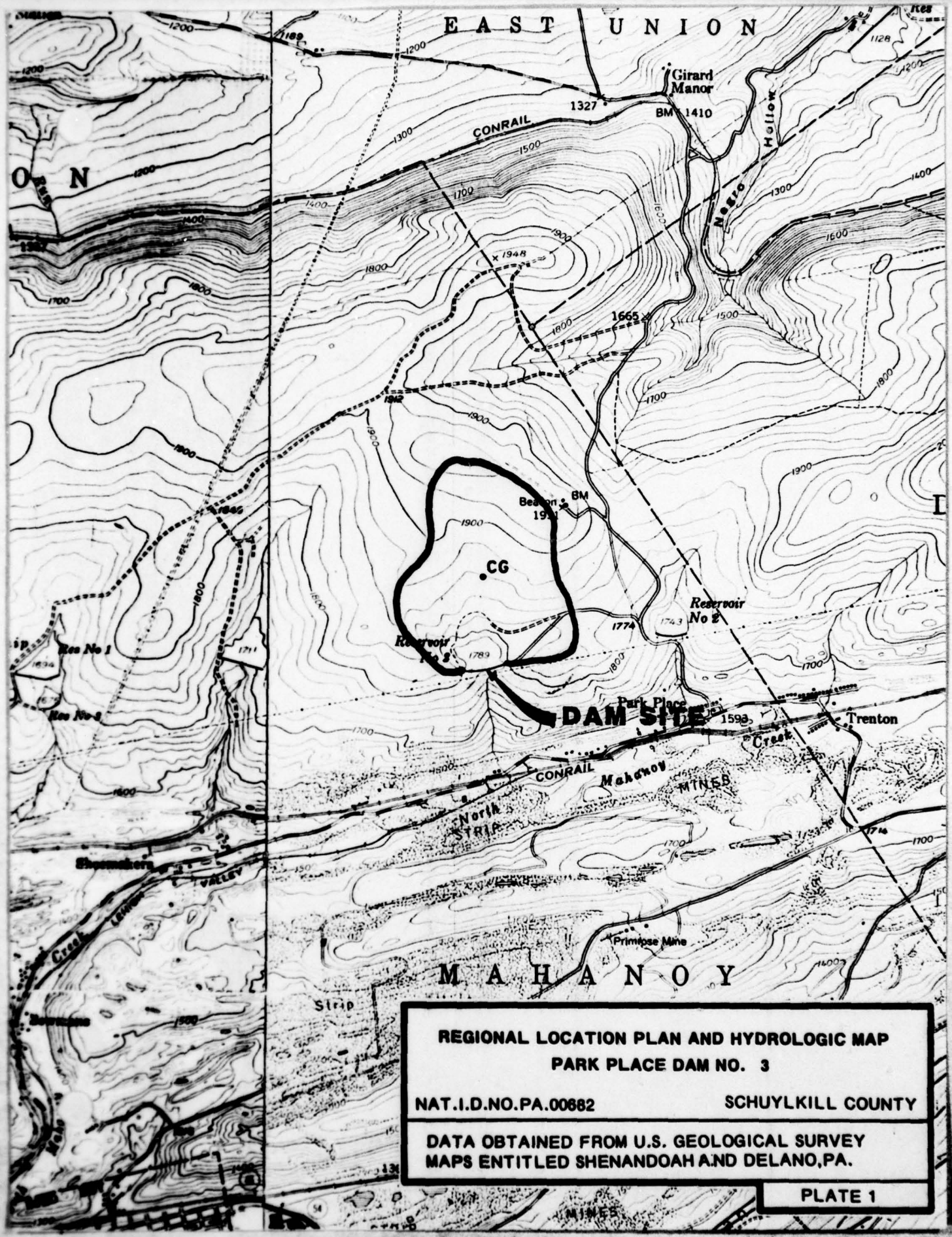
PHOTOGRAPH NO. 11

DOWNSTREAM CHANNEL AT FIRST GROUP
OF HOMES BELOW THE DAM.

PHOTOGRAPH NO. 12

APPENDIX

E

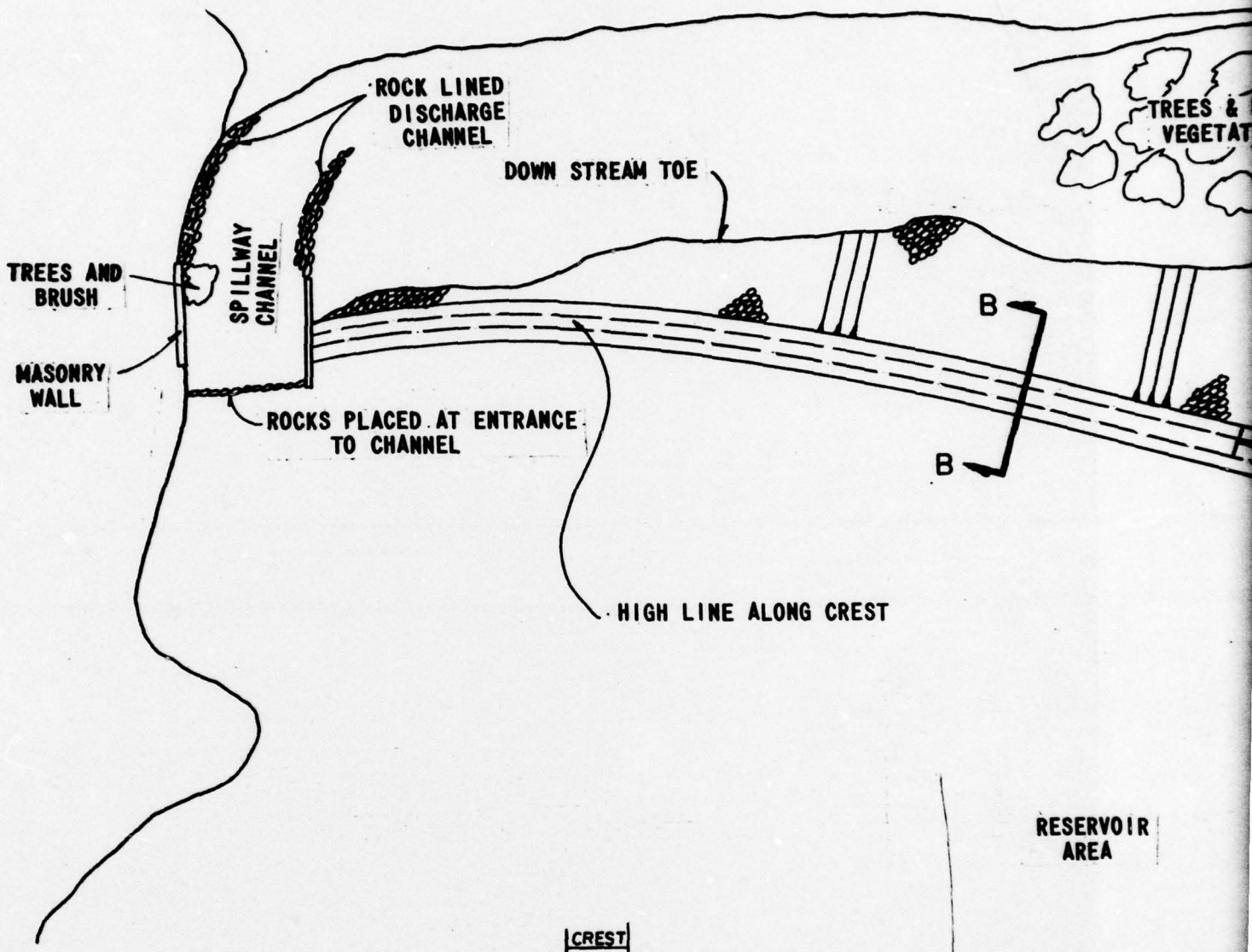


REGIONAL LOCATION PLAN AND HYDROLOGIC MAP
PARK PLACE DAM NO. 3

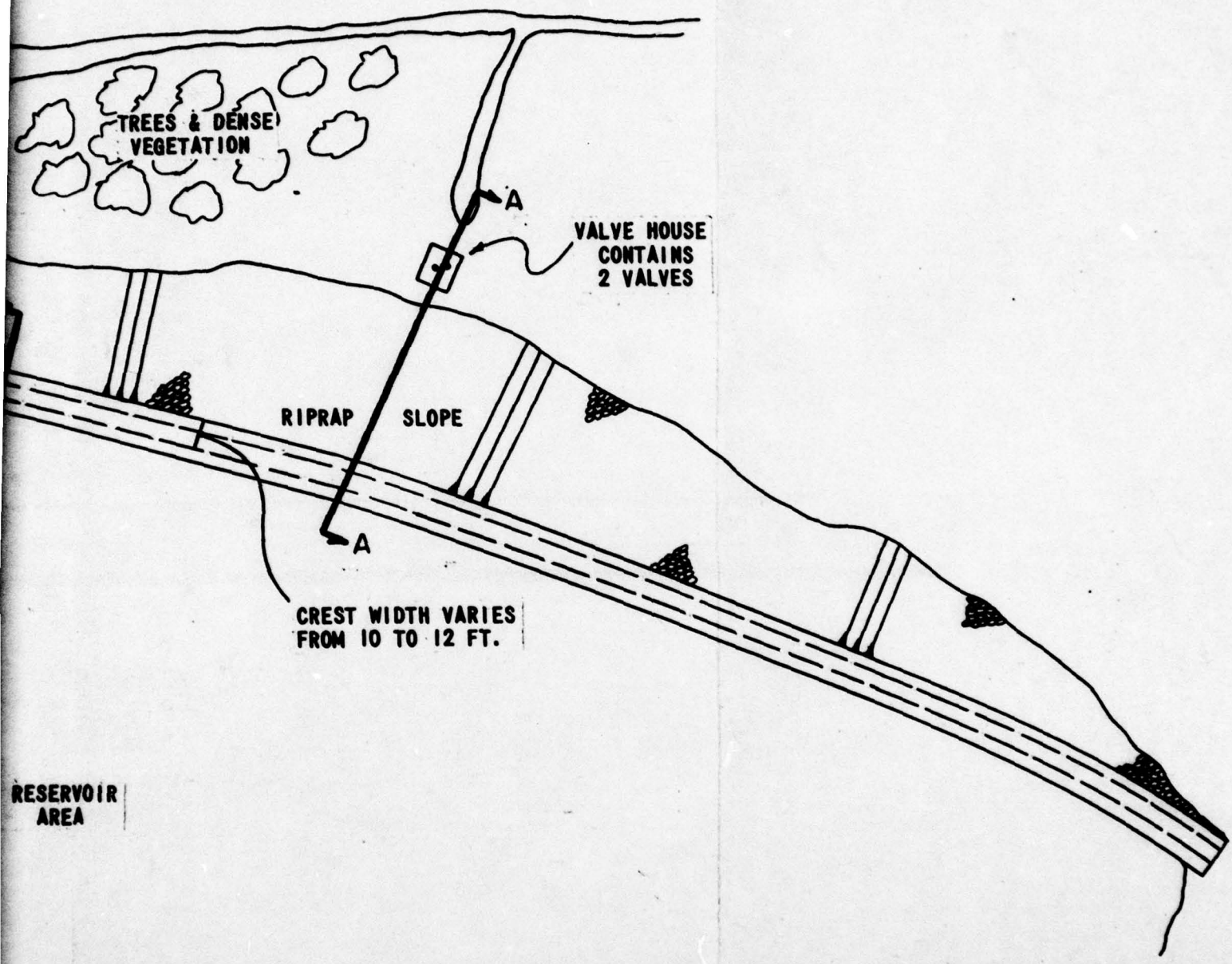
NAT.I.D.NO.PA.00682 **SCHUYLKILL COUNTY**

DATA OBTAINED FROM U.S. GEOLOGICAL SURVEY MAPS ENTITLED SHENANDOAH AND DELANO,PA.

PLATE 1


ROCK LINED
DISCHARGE
CHANNEL
DOWN STREAM TOE
TREES &
VEGETAT
TREES AND
BRUSH
SPILLWAY
CHANNEL
MASONRY
WALL
ROCKS PLACED AT ENTRANCE
TO CHANNEL
B
B
HIGH LINE ALONG CREST
RESERVOIR
AREA
CREST
0
SCALE

SECTION B-B



0 50

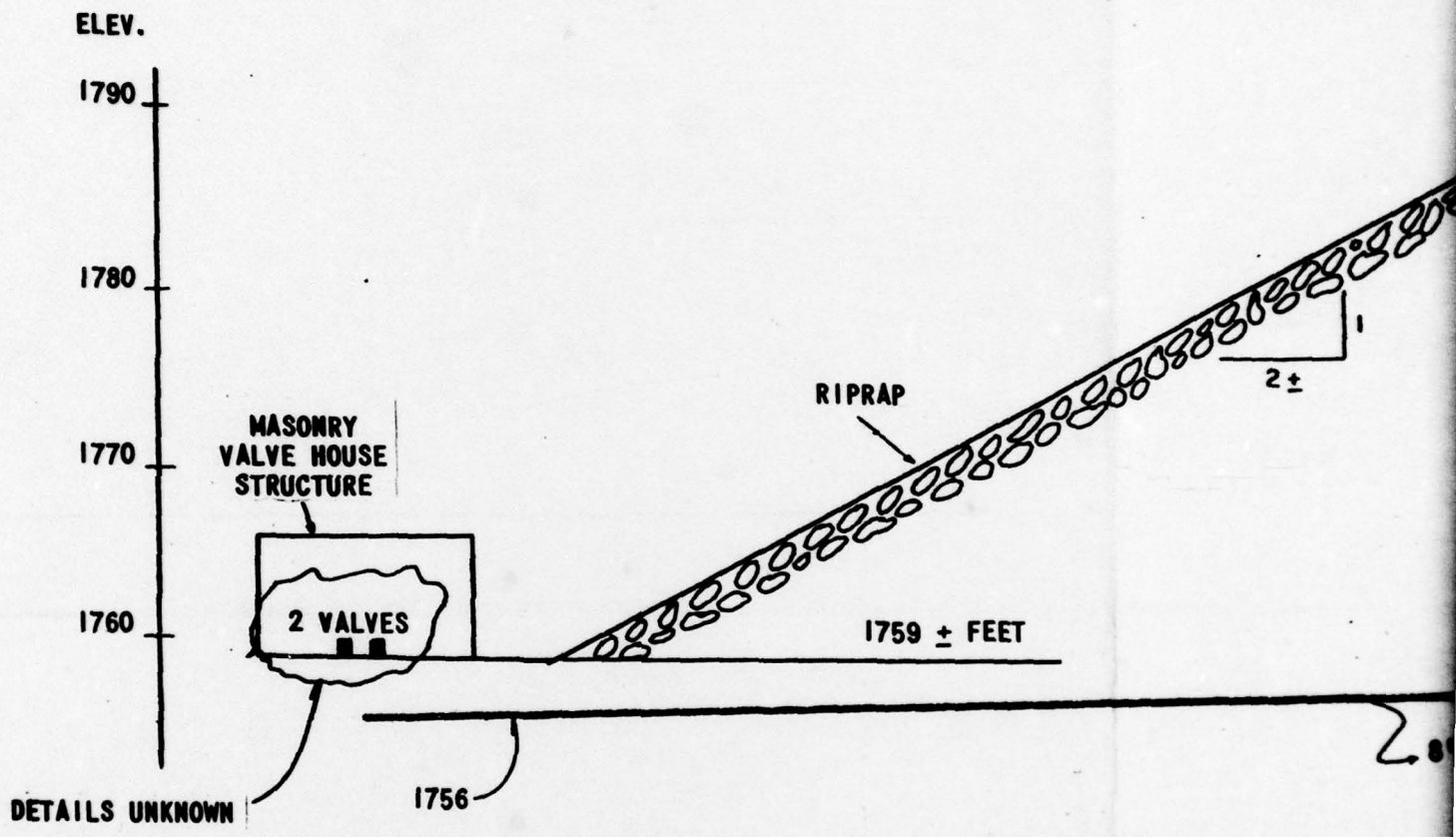
SCALE IN FEET

PLAN OF DAM AND APPURTENANCES
PARK PLACE DAM NO.3

NAT.I.D.NO.PA.00682 | SCHUYLKILL COUNTY

DATA OBTAINED FROM FIELD INSPECTION APRIL,1979

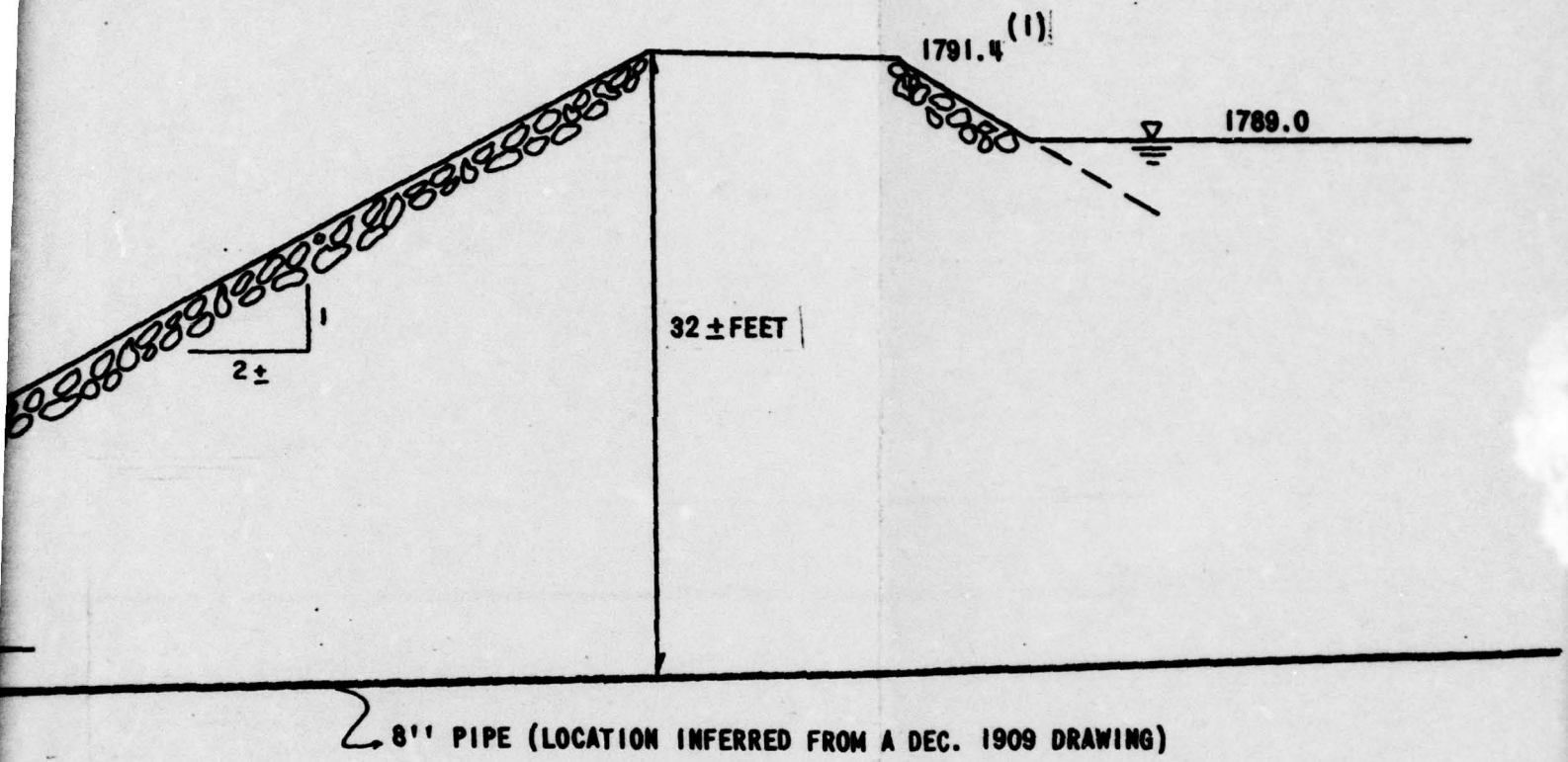
PLATE 2



SECTION
(SEE PLA

0 5 10

SCALE IN FEET



SECTION A-A
(SEE PLATE 2)

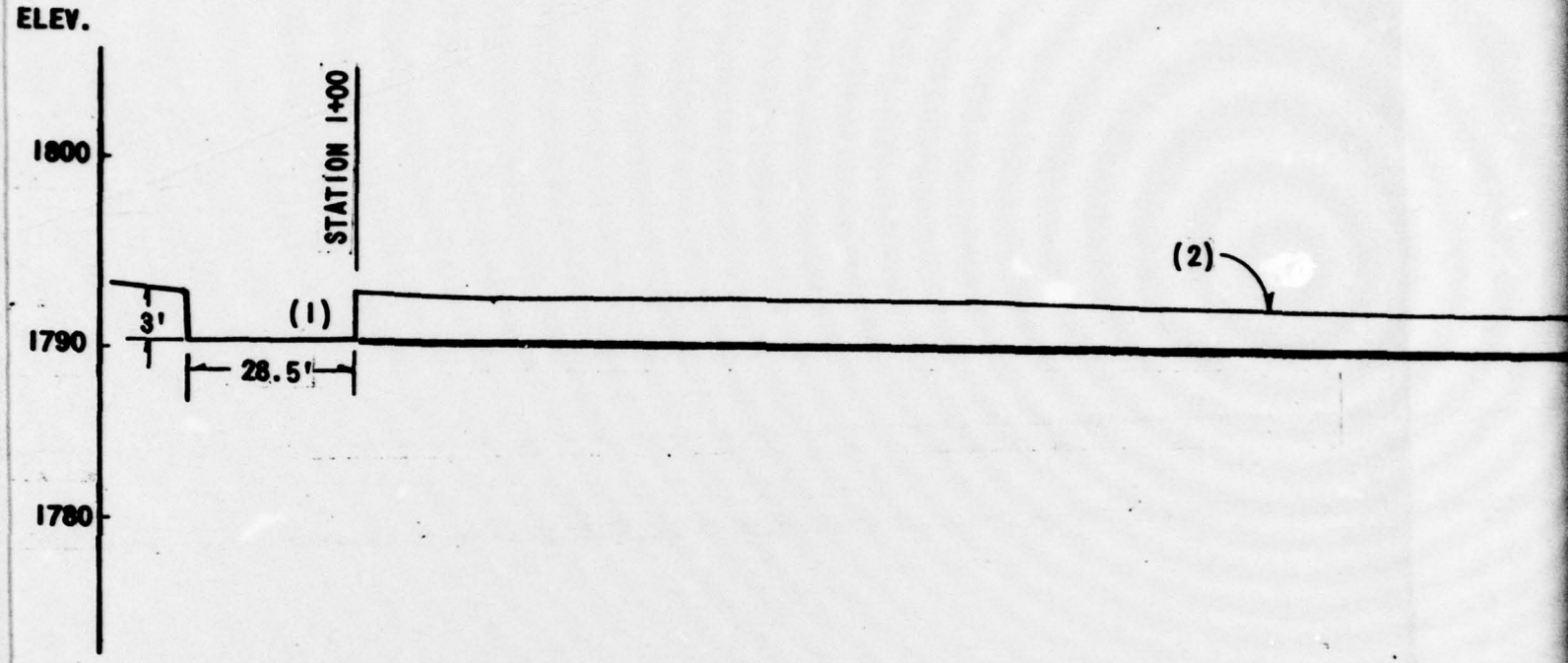
NOTE: (1) REPORTED MAXIMUM ELEV. = 1790.5
(DEC. 1909 DRAWING)

MAXIMUM EMBANKMENT SECTION
PARK PLACE DAM NO. 3

NAT.I.D.NO.PA.00682 | SCHUYLKILL COUNTY

DATA OBTAINED FROM FIELD INSPECTION APRIL, 1979

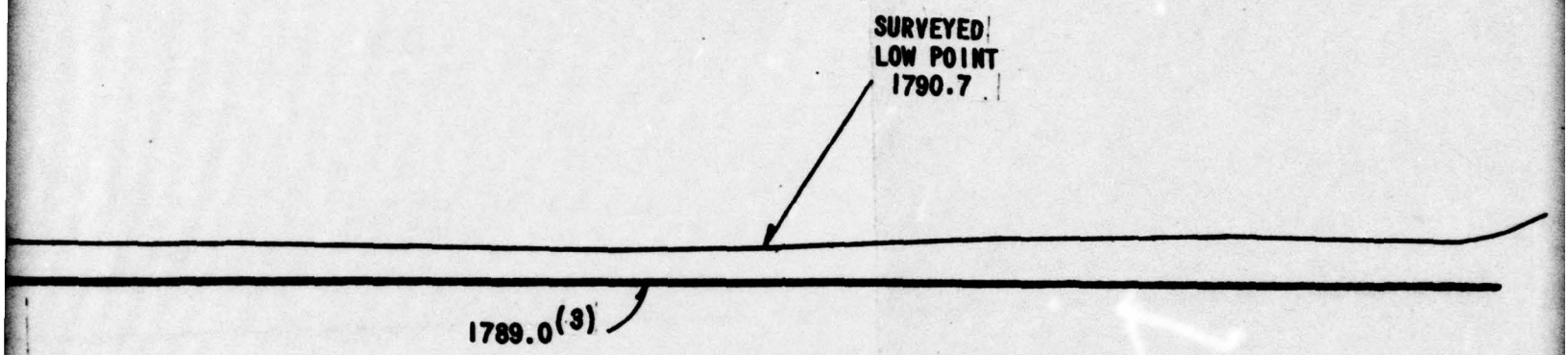
PLATE 3



NOTES: (1) REPORTED SPILLWAY CREST ELEV. 17
FROM DEC. 1909 DRAWING

(2) REPORTED CREST ELEVATION 1790.5
FROM A DEC. 1909 DRAWING

(3) RESERVOIR LEVEL AT TIME OF INSPEC
APRIL, 1979, SPILLWAY ELEVATION TA
FROM U.S.G.S. MAP



Y CREST ELEV. 1787.0
RAWING

LEVATION 1790.5
DRAWING

AT TIME OF INSPECTION
LWAY ELEVATION TAKEN

CENTER LINE PROFILE OF DAM
PARK PLACE DAM NO. 3

NAT.I.D.NO.PA.00882 SCHUYLKILL COUNTY

DATA OBTAINED FROM FIELD INSPECTION APRIL, 1979

PLATE 4

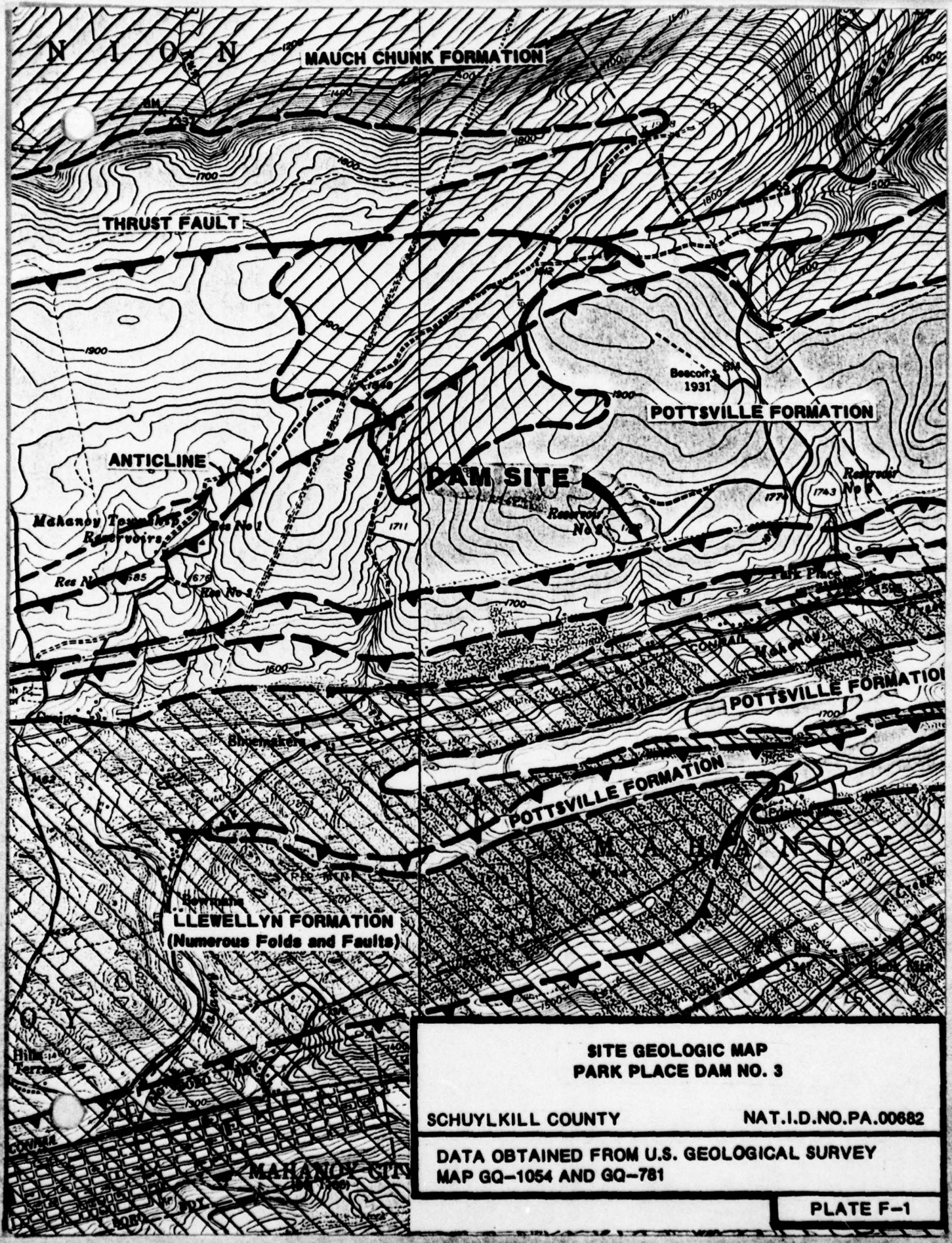
APPENDIX

F

SITE GEOLOGY
PARK PLACE DAM NO. 3

Park Place Dam No. 3 is located in the Appalachian Mountain Section of the Valley and Ridge Physiographic Province. As shown in Plate F-1, the bedrock underlying the dam site area consists of the Pennsylvania Age Pottsville Formation. The predominant rock types in the Pottsville and other formations in the area are sandstone and conglomerate with interbeds of shale and coal locally. The dam site, as is much of central Pennsylvania, is completely folded and faulted. The regional bedrock structure is characterized by a series of northeast to east-northeast trending folds and faults. The dam site is located on the south limb of an east-northeast trending anticline (upfold) and between two easterly striking thrust faults. The region approximately 2,500 feet south of the dam site has experienced much folding and faulting and has been extensively mined for coal.

Except for numerous conglomeratic sandstone boulders, no bedrock exposures were encountered during the field investigation. However, based upon published Pennsylvania geologic maps, the bedrock in the dam site area strikes from near east-west to east-northeast with a southerly (downstream) dip.



SITE GEOLOGIC MAP
PARK PLACE DAM NO. 3

SCHUYLKILL COUNTY NAT.I.D.NO.PA.00682

DATA OBTAINED FROM U.S. GEOLOGICAL SURVEY
MAP GQ–1054 AND GQ–781

PLATE F–1